The relationship between school performance, delinquency and early school-leaving

3 The relationship between school performance, delinquency and early school-leaving

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Introduction

Juvenile risky behaviour has increasingly become of interest to both policymakers and researchers during the past decades. Risky behaviour does not only relate to obvious forms of negative behaviour like drug abuse and delinquency, but also to truancy and early school-leaving (Jessor, 1991, Jessor *et al.*, 1998). Junger and Van der Laan (1997) describe risky behaviour as 'every type of behaviour that poses an unreasonable risk of negative consequences for the individual or others concerning their economic, mental, physical, or social functioning'. In this chapter we will focus on two important forms of risky behaviour: delinquency and early school-leaving. The two forms of risky behaviour are clearly related: young adolescents who become criminally active may decide to leave school early. But the reverse may also be true: early school-leavers have a higher probability to become engaged in criminal activity and/or to be arrested (Freeman, 1999, Lochner, 2004). In this sense there is an interesting dynamic relationship between the two forms of risky behaviour.

In this chapter we analyse the impact of school performance on two forms of risky behaviour: juvenile delinquency and early school-leaving. We also consider the compounding effect of participating in criminal activity on later dropout probability. Our analysis uses a unique dataset that consists of a large survey of secondary school students which is matched to register data containing both educational and offending information for these individuals from adolescence to early adulthood. We also have information on the student's school performance and his/her family background to control for other characteristics that may simultaneously affect delinquency and early school-leaving.

The nature of our data enables us to consider a relatively dynamic setting which estimates the impact of school performance on our two risky behaviours of interest, delinquency before leaving school and leaving school with little or no qualifications, as these take place in sequence. We also analyse how the impact of school performance differs across youths who were previously involved in crime compared to those that were not. Our main finding is that school performance is an important protective factor against risky behaviour. Its effect remains significant even if we account for family background and previous risky behaviour. There

is however an interesting difference between females and males. The protective effect of good school performance is strongest for females who had already been arrested and for males who had not yet participated in such risky behaviour. In line with our assumption, we find a diminishing protective effect of school performance on risky behaviour, if respondents have previously engaged in such behaviour.

The remainder of the chapter is structured as follows: the next section presents the research questions and hypotheses. This is followed by a section describing the data and analytic strategy. We then report our results. We end with a discussion of possible implications of these results for both science and policy.

Research questions and hypotheses

In this chapter we investigate if early school performance is truly a protective factor against participation in risky behaviour through adolescence and early adulthood. The study specifically considers two forms of risky behaviour: juvenile delinquency and early school-leaving. We have the following research questions:

1 Which individual factors affect early delinquency while still in school? In particular what is the protective effect of school performance?
2 How does school performance affect early school-leaving and how is this relationship affected by prior delinquent behaviour?

We follow a simple cost–benefit approach to explain differences in risky behaviour. Adolescents may invest either in a career in school or outside of school. Investment in school will lead to higher qualifications, better job opportunities and corresponding wages. But it is also associated with high costs: there are opportunity costs involved by the time spent in education and direct costs in terms of fees or effort to prepare and do well at school. Alternatively, adolescents may invest in a career outside school, which can either be legal or illegal. Like the investment in education, a career outside school is also associated with costs and benefits and a youth chooses between the legitimate career, with the effort of working and the delayed returns to these efforts in the form of wages, or the illegal career with immediate returns of possible profits but with the costs of potential arrest as well as incarceration.

We assume that school performance affects the costs of an educational career and thus the decision to invest in such a path instead of a career outside education. It thus affects the chance to get involved in delinquent behaviour while at school and also affects the decision to leave school without secondary education qualifications. School performance at a given time can be thought of as resulting from differences in intellectual endowments as well as non-cognitive skills that affect school success. Good cognitive abilities lower the cost of investing in a school career and decrease the chance to invest in a career outside education, reflected in juvenile delinquency or early school-leaving. We thus hypothesize that:

1 School performance is a protective factor against risky behaviour such as juvenile delinquency or early school leaving.

We assume throughout that low school performance increases the likelihood of our two risky behaviour outcome measures but crucially hypothesize that this relationship may change over the life course, and especially once we take into account previous decisions to participate or not in such activities. Following Gottfredson and Hirschi's (1990) argument about the relevance of self-control, we might anticipate that the protective effect of school performance is lower for adult offending compared to early delinquency and early school-leaving. This is assuming that early delinquency is indicative of low levels of self-control, which are also predictive of early school leaving. Adolescents with low levels of self-control put more value on immediate gratifications (i.e. leaving school early) instead of putting effort in the long term benefit of staying in school, irrespective of their performance level. We therefore hypothesize that:

2 The protective effect of school performance on early school-leaving will decrease once an adolescent has participated in risky behaviour such as juvenile delinquency.

Method

Sample and data collection

Student sample

We will use a unique dataset created by matching survey and administrative information on young individuals to explore the underlying mechanisms of how school performance may affect juvenile delinquency and early school-leaving. The basic sample is formed by a large representative survey of Dutch youth carried out by Statistics Netherlands (CBS). This survey, the Secondary Education Pupil Cohort 1999 (VOCL'99), consists of 19,391 students from a random sample of almost 400 schools who were in the first grade of secondary education in the school year 1999/2000.

To facilitate the matching of survey information to administrative data, Statistics Netherlands provides all respondents with a unique identification number that is linked to their social security number. This enables us to match our survey cohort to the longitudinal national student register which is kept by DUO (Dienst Uitvoering Onderwijs, i.e. the body that administers student grants and loans on behalf of the Netherlands Ministry of Education) and thus follow the educational career of VOCL'99 survey respondents from 1999/2000 to 2010/2011 and gather information about which grade the students were enrolled in during each successive year. We can therefore determine the educational level attained at any time, to see for example if the students had to repeat classes or (crucially) were early school-leavers.

Furthermore, general ability tests were administered at the time of the survey giving us a reliable measure of their school performance level at the start of secondary school. A written questionnaire was also given to the parents of the surveyed students with the aim of collecting background information about the students and their families.

Delinquency information

To obtain information about potential delinquent behaviour of our students, the individuals in VOCL'99 were linked to data on all crime suspects in the Netherlands between 1996 and 2010. This information was extracted from the Suspects Identification System (HKS) which is updated annually by the National Police Services Agency (KLPD). A suspect is a person who is charged with a crime. A person can be charged one or several times a year and one summons may include various offences. The arrest's we will consider can be for property (56 per cent), violent (32 per cent), or drug (11 per cent) offences. The data refers to suspects of a criminal offence which does not automatically mean that this person is convicted. However, an estimated 90 per cent of suspects are found guilty at a later stage or are offered a transaction[1] and more importantly, those that were found not to be guilty were removed from the registration (Blom *et al.*, 2005). An individual is therefore considered to have participated in delinquent behaviour if he/she was arrested at least once in a certain year.

Selection of respondents

In this chapter we want to gain a better understanding of the mechanisms that underlie the relationship between early school-leaving and delinquent behaviour among juveniles. Therefore we will focus only on those students in our sample that were no longer enrolled in education by the 2010/2011 school year. This leaves us with 11,699 students who had left school with or without a basic qualification for our analysis.[2]

Variables

Measuring early school-leaving

In the Dutch education system (see Appendix A for a presentation of its features), compulsory education starts at age five (although most children start at age four) and lasts until the age of 16. Since 2007, Dutch youths are obliged to study or to work until the age of 18 or until completion of a full upper secondary (ISCED 3) qualification ('kwalificatieplicht'). Those who have not attained this minimum education level at age 18 are required to either resume education or work until the age of 27 ('leerwerkplicht', officially adopted in 2009). In this chapter, an early school-leaver is defined as a student who was no longer enrolled in education in September 2010 (i.e. the start of the 2010/2011 school year) and who did

not have a full upper secondary qualification. This definition is in line with the international definition of early school-leaving used by the OECD and Eurostat. In our sub-sample of students who had left school, 3,063 (16.9 per cent) of students had not attained this minimum level of education. The risk of becoming an early school-leaver is highest for those who started their education career in the pre-vocational track. About one-third of these students do not attain a full upper secondary qualification. For those who started in the general tracks preparing for vocational colleges or universities, the risk is below 10 per cent.

Delinquency. We use a dummy variable to measure delinquency before school-leaving indicating if the student had been arrested by the police before the date he or she left school.

Measurement of school performance

School performance is an index based on three subtests taken in the first months of secondary school that measure the students' aptitude in arithmetic/mathematics, text comprehension and information processing skills. The index is normalized to a scale with a minimum of 0 and a maximum of 1.

Personal and family characteristics

Personal and family background variables we have available from the VOCL'99 survey include: gender, ethnicity, age left school, parental religion, and parental marital status at the start of secondary school. We also have information on parental educational level, parental reading behaviour as a proxy for cultural activity from the 2000 parental questionnaire and parental income in 2005 from the Annual Income Registry that is kept by Statistics Netherlands and is based on information from the Dutch Tax Administration. Some of these characteristics are missing for a few survey participants when the parents did not answer all questions (3 to 14 per cent, depending on the variable). For these individuals we will therefore replace the missing value with the population mean and include characteristic missing dummies to capture potential selection in responding to the survey.

Analytical strategy

We will start our analysis by estimating simple logistic regression equations where β_0 is a constant and u an error term. For each individual i we have two different dummies for our two outcomes of interest: participation or not in delinquency before school leaving and for early school-leaving. As *AgeLeftSchool* will mechanically increase the chances of observing more or less delinquency before school leaving, we control for this in all specifications. We also will want to control for the secondary school-track a student is in, *EducLevel12*, as it is likely to be very predictive of qualification status at school leaving. The key coefficient

here is the β_1 which is the impact of school performance on the likelihood of participation in the two risky behaviours of interest. The first basic logistic regression we estimate with, Y representing either outcome, is therefore:

$$Y_i \sim p(Y_i \mid \theta_i) \quad p(Y_i \mid \theta_i) = exp[Y_i\theta_i - log(1 + exp(\theta_i))]$$

with

$$\theta_i = \beta_0 + \beta_1 SchoolPerformance_i + \beta_2 AgeLeftSchool_i + \beta_3 EducLevel12_i + u_i \tag{3.1}$$

We assume that individual and family characteristics affect both school performance and risky behaviour participation and we therefore estimate the same specification as in (3.1) but add all our individual characteristics and family background controls:

$$\begin{aligned}\theta_i = {} & \beta_0 + \beta_1 SchoolPerformance_i + \beta_2 AgeLeftSchool_i \\ & + \beta_3 EducLevel12_i + \beta_4 Gender_i + \beta_5 Migrant_i \\ & + \beta_6 ParentReligion_i + \beta_7 ParentMarried_i + \beta_8 ParentEducation_i \\ & + \beta_9 ParentRead_i + \beta_1 0 ParentIncome_i + u_i\end{aligned} \tag{3.2}$$

The main coefficient of interest is still β_1 but it will now be net of the effect of all the other βs which take into account possible simultaneous associations.

In a third step we estimate models that also control for the effect of past participation in risky behaviour. This will give us an estimate of the effect of school performance on the likelihood of being an early school-leaver, so that then $Y_i = EarlySchoolLeaving_i$, controlling for the effect γ of an individual being criminally active before dropping out. Note that in (3.3) all control variables are summed:

$$\theta_i = \beta_0 + \beta_1 SchoolPerformance_i + \sum_{k=10}^{N} Controls_{ik} + \gamma CrimeBefore_i + u_i \tag{3.3}$$

In our final model described by (3.4) we consider the addition of an interaction between School Performance and past participation in risky behaviour:

$$\theta_i = \beta_0 + \beta_1 SchoolPerformance_i + \sum_{k=10}^{N} Controls_{ik} + \gamma CrimeBefore_i + \delta CrimeBefore_i * SchoolPerformance_i + u_i \tag{3.4}$$

This specification will give us the estimate of the impact of school performance on early school-leaving specifically for individuals who were criminally active before dropping out. We expect these modelling strategies to enable us to

demonstrate that the protective effects of school performance in explaining risky behaviour participation decreases when past risky behaviour participation is taken into account.

All equations will be estimated for the total group as well as for males and females separately.

Results

Descriptives

Table 3.1 describes the distribution of crimes committed before school-leaving by both school-leaving status and educational level at age 12. In the total group, 12 per cent committed a crime before school-leaving. Early school-leavers are much more likely to have committed a crime before leaving school (22.7 per cent) compared to regular school-leavers (8.7 per cent). Those who are still at school have a slightly higher proportion having committed a crime (11.5 per cent) than regular school-leavers, but we need to keep in mind that the observation period is also longer for this group. If we split by gender, we can note that committing a crime is a typical male activity. Of the males in our sample, 19.7 per cent have committed a crime before school-leaving compared to only 4.4 per cent of the females.

Since there is a high correlation between the educational level and the risk of becoming an early school-leaver, Table 3.1 also shows the distribution of delinquency outcomes and the educational level at age 12. Students that were in the lowest track of secondary school at age 12 were much more likely to commit crimes before leaving school (15 per cent) compared to those in the pre-college (9.4 per cent) and pre-university tracks (7.6 per cent). We observe the same relative differences when we split by gender.

Table 3.2 shows the distribution of school performance and of the background variables for the total sample as well as for those who were involved or not in one of the two risky behaviours of interest. The sample is restricted to the 11,699 students who have left education (with or without a starter's qualification) by the start of the 2010/2011 school year. Those who are still at school are left out. The results seem to support the assumption that low school performance is correlated with higher levels of juvenile delinquency and especially early school-leaving.

Table 3.2 also shows the distribution of our background variables for the individuals in our samples who participated or not in our two measures of risky behaviour. As in most of the literature we see that males and those with foreign-born parents are significantly more at risk of being delinquents as well as being early school-leavers. Parental religion and marital status also account for some of the differences in participation in risky behaviour: risky behaviour is higher among parents who have no religion or 'other non-Christian religion' and lower among Protestants. The risky behaviour is also higher among parents who were never married or who are widowed or divorced. All these differences apply more

Table 3.1 Descriptives of criminal behaviour outcomes by school leaving status and education level at age 12 split by gender

		Total	Committed crime before school-leaving?		Men	Committed crime before school-leaving?		Women	Committed crime before school-leaving?	
		Count	No	Yes	Count	No	Yes	Count	No	Yes
Total		18,092	15,913 (88.0%)	2,179 (12.0%)	8,971	7,208 (80.3%)	1,763 (19.7%)	9,121	8,721 (95.6%)	400 (4.4%)
School-leaving status	Early school-leavers	3,063	2,368 (77.3%)	695 (22.7%)	1,734	1,163 (67.1%)	571 (32.9%)	1,329	1,213 (91.3%)	116 (8.7%)
	Regular school-leavers	8,636	7,885 (91.3%)	751 (8.7%)	3,757	3,156 (84.0%)	601 (16.0%)	4,879	4,737 (96.1%)	142 (3.8%)
	Still in school	6,393	5,660 (88.5%)	733 (11.5%)	3,480	2,889 (83.0%)	591 (17.0%)	2,913	2,771 (95.1%)	142 (4.9%)
Educational track at age 12	Pre-vocational track	9,982	8,487 (85.0%)	1.495 (15.0%)	4,983	3,787 (76.0%)	1,196 (24.0%)	4,999	4,710 (94.2%)	289 (5.8%)
	Pre-college track	3,870	3,507 (90.6%)	363 (9.4%)	1,897	1,600 (84.3%)	297 (15.7%)	1,973	1,908 (96.7%)	65 (3.3%)
	Pre-university track	4,240	3,919 (92.4%)	321 (7.6%)	2,091	1,821 (87.1%)	270 (12.9%)	2,149	2,103 (97.9%)	46 (2.1%)

Table 3.2 Distribution of school performance and background variables, by risky behaviour, gender for school leavers

	All				Men				Women			
	Committed crime before school-leaving?		Left school without a starter's qualification?		Committed crime before school-leaving?		Left school without a starter's qualification?		Committed crime before school-leaving?		Left school without a starter's qualification?	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Total (N=11,699)	87.8%	12.2%	73.8%	26.2%	78.7%	21.3%	68.4%	31.6%	95.8%	4.2%	78.6%	21.4%
Mean school performance	0.55	0.47	0.57	0.44	0.47	0.55	0.44	0.57	0.45	0.55	0.58	0.43
Background variables												
Gender												
Male	36.9%	10.0%	32.1%	14.8%	.	.	.	.	.	.	.	.
Female	50.9%	2.2%	41.7%	11.4%	.	.	.	.	.	.	.	.
Migrant status												
Migrant	6.6%	2.7%	5.4%	3.9%	5.7%	4.6%	5.3%	5.0%	7.4%	1.0%	5.5%	2.8%
Native	81.2%	9.5%	68.4%	22.3%	72.9%	16.7%	63.1%	26.5%	88.5%	3.2%	73.1%	18.6%
Age 12 educ. level												
Pre-vocational track	54.6%	9.3%	41.3%	22.6%	49.6%	16.2%	38.9%	26.9%	59.0%	3.2%	43.5%	18.8%
Pre-college track	18.0%	1.7%	17.4%	2.3%	16.1%	2.9%	16.1%	2.9%	19.6%	0.6%	18.5%	1.7%
Pre-university track	15.2%	1.2%	15.1%	1.3%	13.0%	2.2%	13.4%	1.8%	17.2%	0.3%	16.6%	1.0%
Mean age left educ.	20.5	20.5	21.1	19.0	20.5	20.5	21.1	19.1	20.6	20.5	21.0	18.8

Parental religion												
No religion	33.4%	6.1%	27.0%	12.5%	31.2%	10.6%	26.4%	15.4%	35.3%	2.1%	27.5%	9.9%
Catholic	28.5%	2.9%	24.2%	7.3%	24.5%	5.2%	21.1%	8.5%	32.1%	1.0%	26.9%	6.2%
Protestant	22.2%	2.0%	19.7%	4.5%	19.9%	3.5%	18.1%	5.3%	24.3%	0.7%	21.2%	3.9%
Other non-Chr.	3.6%	1.2%	3.0%	1.9%	3.1%	2.1%	2.8%	2.4%	4.1%	0.4%	3.1%	1.4%
Parental marital status												
Married/cohabiting	80.9%	10.6%	68.3%	23.1%	72.9%	18.6%	63.4%	28.1%	87.9%	3.4%	72.7%	18.7%
Never married	0.9%	0.4%	0.7%	0.6%	0.9%	0.6%	0.8%	0.7%	0.9%	0.1%	0.6%	0.5%
Widowed/divorced	6.0%	1.3%	4.8%	2.5%	4.8%	2.1%	4.2%	2.7%	7.0%	0.6%	5.3%	2.3%
Mean parental education (0–1)	0.57	0.50	0.59	0.48	0.58	0.51	0.59	0.49	0.57	0.47	0.06	0.46
Parental reading behaviour (scale 0–1)	0.09	0.09	0.10	0.08	0.10	0.09	0.10	0.09	0.09	0.08	0.10	0.08
Mean parental income (log)	10.1	10.0	10.2	10.0	10.2	10.0	10.2	10.0	10.1	10.0	10.2	10.0

strongly for males than for females. There is also a significant negative relationship between level of parental education and our two outcomes of interest, albeit stronger for early school-leaving than for juvenile delinquency. There is also some negative effect of low income and low reading behaviour of the parents.

Table 3.2 also reports the differences in average age when leaving school between individuals who participated in risky behaviour or not. As expected our early school-leavers stopped school when they were on average younger.

Effects of school performance on juvenile delinquency and early school-leaving

The simple model described by (3.1) above is reported for crime before school leaving in column (1) of Table 3.3. All estimates are presented as marginal effects. The results show that school performance has a strong protective influence on the likelihood of participating in this type of risky behaviour. One standard deviation increase in school performance decreases the chance to commit a crime before school-leaving by 20 per cent. Students in the lowest track of secondary education are also more at risk of participating in crime before school-leaving.

We then augment the model with the inclusion of individual and family background variables and the results are displayed in column (2) of Table 3.3. Controlling for gender, migrant status and some family characteristics reduces by almost half the protective effect of school performance on the probability of committing a crime before school-leaving. The results show that males and migrants are particularly more at risk of being arrested before leaving school. Interestingly, parental religion is consistently estimated to be a significant protective factor as will be shown throughout our analyses, especially having parents of Protestant descent. Having parents that were not married or cohabiting at age 12 significantly increases the risk of early criminal behaviour, while a high level of parental education reduces the risk.

Columns (3) and (4) in Table 3.3 describe the impact of school performance with and without background characteristics on early school-leaving. The effects we estimate are very strong and a one standard deviation increase in school performance decreases the chance to leave school early without a qualification by 44 per cent. Also early school-leaving is more prominent among those who entered the lowest track of secondary education. The impact of school performance changes only marginally after controlling for the background variables, reinforcing the importance of school performance on predicting this outcome. The risk factors for early school-leaving are comparable to what we have seen in the previous analysis for criminal participation. Males and migrants are more at risk of becoming early school-leavers compared to females and natives. Parental religion is also a protective factor while parental marital status is a risk factor when parents are not married. Parental education and parental income both serve as protective factors against early school-leaving.

One of the questions raised in this chapter is if past risky behaviour increases the risk of participating in other risky behaviour, above and beyond school performance. Therefore we add a dummy to the model to see if being arrested by the police during school increases one's risk of becoming an early school-leaver. The results are reported in column (5) in Table 3.3. Indeed, we see a strong effect of previous arrests. Previous arrests significantly increase the chance of becoming an early school-leaver.

The specifications of columns (2) and (5) have also been estimated separately for males, in columns (2') and (5'), and females, in columns (2") and (5"). There are some interesting things to note. School performance has a much stronger protective effect for males than for females, both for committing a crime before school-leaving and for early school-leaving. In the case of committing a crime, a one standard deviation increase of school performance decreases the chance to commit a crime by 23 per cent for males and only 6 per cent for females. For early school-leaving the figures are 42 per cent and 30 per cent respectively. We also note that being a migrant increases the chance to commit a crime much more for males than for females. And the same applies for being a son or a daughter of a divorced or widowed parent. These differences are in general less strong in the analyses where early school-leaving is the dependent variable.

Conversely, we can see that the protective effect of both parental religion and parental education is much stronger for males than for females at least in the case of committing a crime before school-leaving. In the analysis on early school-leaving we can see that there is a stronger protective effect of parental education for females than for males.

Finally we also see that having committed a crime before school-leaving increases the chance to leave school early more for males than for females.

In general we can conclude from the results reported in Table 3.3 that school performance is negatively linked to both delinquency before school-leaving and the risk of early school-leaving, with the strongest effects for males. Our results also make it clear that past risky behaviour is a very strong predictor of future risky behaviour.

Interaction effects

To measure if the 'returns' to school performance differ depending on past participation in risky behaviour we now turn to models which include an interaction term between school performance and being arrested before leaving education as described in Equation (3.4) earlier. The results are presented in Table 3.4, again for the whole sample and separately for males and females. For each of these groups we first report the final specifications of Table 3.3 which include a measure of past risky behaviour for comparison. We then show the results when including an interaction between school performance and crime before school-leaving.

We do find that this interaction is strong and significant. The main effect for school performance (i.e. −0.393) represents the protective effect of school performance for students who were not arrested. The interaction term (0.180)

Table 3.3 Logistic regression marginal effects of school performance on crime before (early) school-leaving, by gender

	Committed crime before school-leaving?				Left school without a basic qualification?				
	All		Men	Women	All			Men	Women
	(1)	(2)	(2')	(2")	(3)	(4)	(5)	(5')	(5")
Education variables									
School performance	−0.202**	−0.115**	−0.229**	−0.058**	−0.443**	−0.388**	−0.364**	−0.419**	−0.299**
Age leaving school	0.004**	0.004**	0.008**	0.001	−0.079**	−0.077**	−0.079**	−0.095**	−0.062**
Track age 12 (Pre-vocational track ref)									
Pre-college track	−0.019*	−0.012	−0.030	−0.002	−0.104**	−0.094**	−0.093**	−0.109**	−0.075**
Pre-university track	−0.023*	−0.011	−0.017	−0.008	−0.117**	−0.107**	−0.106**	−0.126**	−0.085**
Background variables									
Gender (Female ref.)									
Male		0.156**				0.089**	0.061**		
Migrant status (Native ref.)									
Migrant		0.089**	0.184**	0.023*		0.095**	0.073**	0.091**	0.056*
Parental religion (None ref.)									
Catholic		−0.028**	−0.059**	−0.013*		−0.033**	−0.028**	−0.028	−0.025*
Protestant		−0.030**	−0.071**	−0.008		−0.072**	−0.067**	−0.083**	−0.051**
Other non-Christian		−0.020*	−0.047*	−0.005		−0.007	−0.002	0.017	−0.016
Parental marital status (Married/cohabiting ref.)									
Never married		0.052**	0.103	0.023		0.080**	0.068*	0.028	0.095*
Widowed or divorced		0.044**	0.077**	0.025*		0.062**	0.052**	0.060	0.041*
Parental education (0–1)		−0.030**	−0.056*	−0.018*		−0.093**	−0.088**	-0.068*	-0.087**
Parental reading behaviour (scale 0–1)		−0.071	−0.085	−0.092*		0.028	0.045	0.148	−0.025
Parental mean income (log)		−0.002	−0.003	−0.001		−0.013**	−0.012**	−0.024**	−0.006
Controls for missing values	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Crime before school-leaving							0.170**	0.193**	0.152**
R^2	2.6%	15.3%	6.1%	7.6%	24.5%	28.4%	29.6%	26.9%	31.5%

Notes
** $p \leq 0.01$
* $p \leq 0.05$.

Table 3.4 Logistic regression marginal effects for predicting the interaction effect of school performance on crime before school-leaving, split by gender

	Early school-leaving					
	All		Men		Women	
	(1)	(2)	(1')	(2')	(1")	(2")
School performance	−0.364**	−0.393**	−0.419**	−0.460**	−0.299**	−0.311**
Age leaving school	−0.079**	−0.078**	−0.095**	−0.094**	−0.062**	−0.061**
Track age 12 (Pre-vocational track ref.)						
Pre-college track	−0.093**	−0.092**	−0.109**	−0.108**	−0.075**	−0.075**
Pre-university track	−0.106**	−0.105**	−0.126**	−0.125**	−0.085**	−0.084**
Background variables						
Gender (Female ref.)						
Male	0.061**	0.061**				
Migrant status (Native ref.)						
Migrant	0.073**	0.074**	0.091**	0.093**	0.056*	0.057*
Parental religion (None ref.)						
Catholic	−0.028**	−0.027**	−0.028	−0.027	−0.025*	−0.024*
Protestant	−0.067**	−0.065**	−0.083**	−0.081**	−0.051**	−0.050**
Other non-Christian	−0.002	−0.003	0.017	0.017	−0.016	−0.017
Parental marital status (Married/cohabiting ref.)						
Never married	0.068*	0.066*	0.028	0.026	0.095*	0.094*
Widowed or divorced	0.052**	0.053**	0.060	0.061	0.041*	0.042*
Parental education (0–1)	−0.088**	−0.088**	−0.068*	−0.070*	−0.087**	−0.087**
Parental reading behaviour (scale 0–1)	0.045	0.048	0.148	0.154	−0.025	−0.026
Parental Mean income (log)	−0.012**	−0.012**	−0.024**	−0.023**	−0.006	−0.006
Controls for missing values	Yes	Yes	Yes	Yes	Yes	Yes
Crime before school-leaving	0.170**	0.059	0.193**	0.099	0.152**	0.029
Crime before school-leaving * School performance		0.180**		0.167*		0.183*
R^2	29.6%	29.7%	26.9%	26.9%	31.5%	31.5%

Notes
** $p \leq 0.01$
* $p \leq 0.05$.

indicates that the protective effect of school performance for students that were arrested before leaving school is much smaller, namely $-0.393 + 0.180 = -0.213$. The interaction effect is perhaps best depicted graphically as in Figure 3.1 which shows the mean probability of leaving school early by one's level of school performance for those that did commit an offence versus those that did not. The figure shows that the probability of becoming an early school leaver declines when school performance increases, however, this protective effect is stronger for those

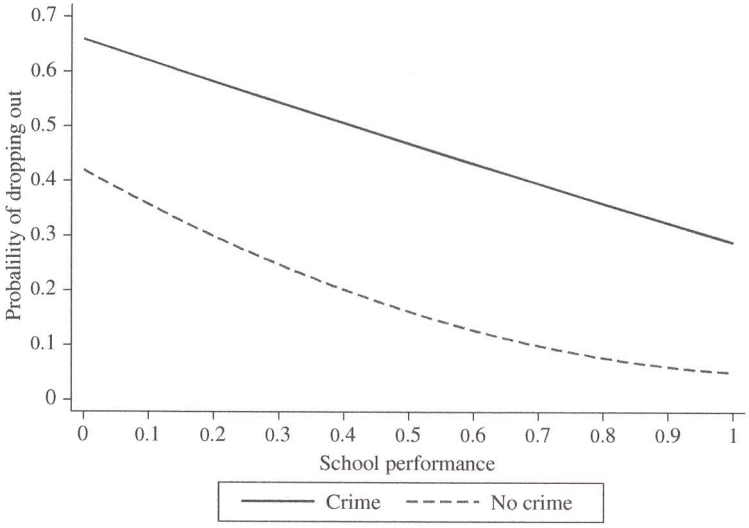

Figure 3.1 Probability function of the effect of school performance on the risk of early school-leaving by school performance and crime before school-leaving.

that were never arrested by the police before leaving school, especially for the lower levels of school performance. For the higher levels of school performance we can clearly see a ceiling effect for those who never committed a crime. The probability of dropping out is already so low at the average performance level, that a further increase in the school performance hardly has any further effect.

There is an interesting difference when we split the results by gender. For those who had already participated in crime, we can observe a much stronger protective effect of school performance for females than for males. And for those who had not committed a crime before school-leaving, the ceiling effect is reached much earlier for females than for males. In other words, good school performance serves as a protective factor preventing early school leaving, especially for females who had already participated in rick behaviour and for males who had not yet participated in risky behaviour. These separate effects by gender are depicted in Figure 3.2 with men in the left graph and women in the right graph and this clearly reveals a steeper slope for the latter.

In this chapter we attempted to measure the importance of school performance in predicting participation in risky behaviour. We have used a rather unique dataset in which panel data are matched with register data on criminal behaviour and early school-leaving. To our knowledge such a dataset has never been used before. The obvious advantage of using register data is that panel mortality is practically zero. And what is even more important: the data come from an objective and reliable source. This is different from the subjective data on crime that are often used in other analyses. The same holds for the data that have been used to measure school performance. These are all based on test results. We therefore

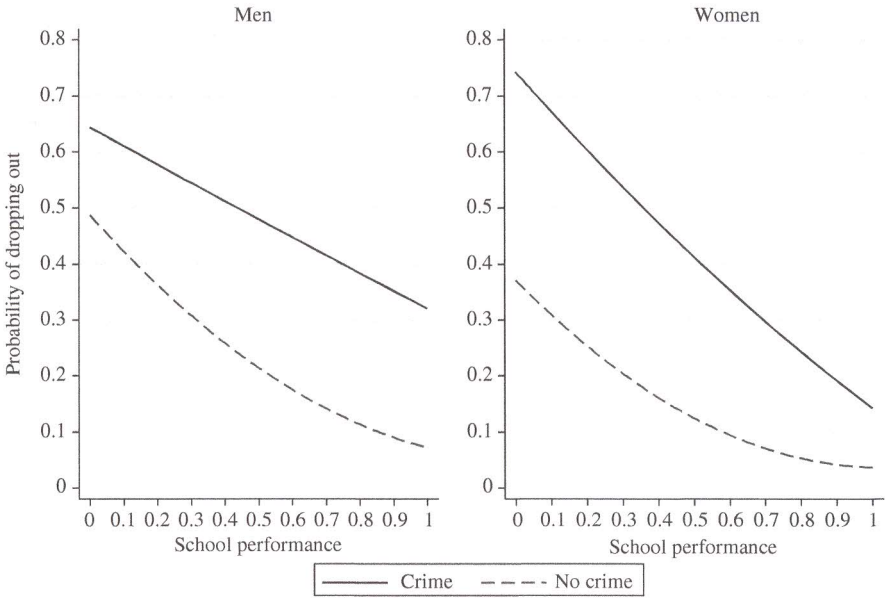

Figure 3.2 Probability function of the effect of school performance on the risk of early school-leaving by school performance and crime before school-leaving, by gender.

think that we have exploited a strong dataset for this analysis. Nevertheless, the analysis is not based on experimental data. This makes it hard to draw any strong conclusions on causality. The effect of school performance on risky behaviour might well be caused by some omitted variable. And the same may hold for the effect of delinquency on early school-leaving. In subsequent analyses we will use other techniques such as propensity score matching or instrumental variables to address this problem of unobserved heterogeneity. And we will also address an issue that has not been analysed here, namely the relation between early school-leaving and later criminal behaviour.

Implications for policy and practice

In general we can say that school performance indeed matters. Good school performance serves as a protective factor preventing early school-leaving, especially for females who had already participated in risky behaviour and for males who had not yet participated in risky behaviour. At the same time our results make it clear that past risky behaviour is a very strong predictor of future risky behaviour. This is in line with Gottfredson and Hirschi's (1990) argument on the importance

of one's capacity for self-control as an explanation of why some individuals engage in risky behaviour and others do not.

The question remains how to best interpret these findings to prevent adolescents from lapsing from one form of risky behaviour into another? They primarily suggest that increasing school performance levels could significantly decrease risky behaviour. Targeting the poorest performers at an early age should therefore be advocated as it appears to be the most efficient means to reducing their subsequent participation in all forms of risky behaviour. This seems specifically true for males as they are more at risk for such behaviour than females. For males early intervention is truly important, as the protective effects of school performance do not work well, once they have engaged in risky behaviour.

This is not the case for females. Their chances to get involved in risky behaviour are small. And even if they have been involved in committing a crime during education, their school performance can still serve as an important protective factor. For this – small – group, continued investment in improving school performance is therefore worthwhile.

Notes

1 A transaction can prevent prosecution, if certain conditions set by the police or the public prosecutor are met, e.g. paying an amount of money (fine). Data on various types of crimes, such as economic and environmental offences and social security fraud are usually not entered into the HKS and therefore underrepresented in the statistics.

2 Students who had died, were seriously ill or had moved abroad within the 1999/2000–2010/2011 period were removed from the sample. In some cases the link to the social security number could not be made and therefore a student could not be given an identification number. These respondents were also removed from the sample. In total, 473 students were removed from the sample. Finally we excluded all students born before 1986 or after 1987 (826). These were students that had either skipped a grade in primary school or repeated more than one grade by the time of the survey and were thus either older or younger than could be expected of a cohort of first graders.